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U 012967-6 A

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PATENT TRADEMARK OFFICE

PATENT

Attorney's Docket No.: U 012967-6

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of Inventors:

1. ANDY **DEBECKER**
2. OSCAR **CHRISTOPH VAN DER JAGT**
3. JAN JACOBUS **MATTHIJS KOPPERT**

WARNING: *The Declaration must name all of the actual inventor(s).*

For (title):
FIBRE-REINFORCED PRESSURE VESSEL AND METHOD OF MANUFACTURING A FIBRE-REINFORCED PRESSURE VESSEL

1. Type of Application

This new application is for a(n) (check one applicable item below):

- ☑ Original (nonprovisional)
- ☐ Design
- ☐ Plant

WARNING: ***Do not*** *use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4) unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date **SEPTEMBER 29, 2000 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL699731755US addressed to the: Assistant Commissioner of Patents, Washington, D.C. 20231**

IBIS CARRILLO
(type or print name of person mailing paper)

Ibis Carrillo
(Signature of person mailing paper)

NOTE: *Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).*

WARNING: ***Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.***

EL699731755US

WARNING: ***Do not*** *use this transmittal for the filing of a provisional application.*

2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

WARNING: If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

WARNING: When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional ***must*** *be filed prior to the Saturday, Sunday or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).*

☐ The new application being transmitted claims the benefit of prior U.S. application(s) and enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

NOTE: If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

☐ Divisional.

☐ Continuation.

☐ Continuation-in-Part (C-I-P).

3. Papers Enclosed That Are Required For Filing Date Under 37 CFR 1.53 (Regular) or 37 CFR 1.153 (Design) Application

_7_ Pages of specification

_3_ Pages of claims

_1_ Pages of Abstract

_5_ Sheets of drawing

☑ formal

☐ informal

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (⅝ inch) down from the top of the page." 37 C.F.R. 1.84(c).

(complete the following, if applicable)

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)". 37 C.F.R. 1.84(b).

4. Additional papers enclosed

☑ Preliminary Amendment

☐ Information Disclosure Statement (37 CFR 1.98)

☐ Form PTO-1449

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☐ Other

5. Declaration or oath

☑ Enclosed

executed by *(check **all** applicable boxes)*

☑ inventors.

☐ legal representative of inventors. 37 CFR 1.42 or 1.43

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. *See item 13 below for fee.*

☐ Not Enclosed.

WARNING: *Where the filing is a completion in the U.S. of an International Application but where a declaration is not available or where the completion of the U.S. application contains subject matter in addition to the International Application the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.*

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of *all the above named inventors.* (The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized. *(Not required unless called into question. 37 CFR 1.41(d).)*

6. Inventorship Statement

WARNING: *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

☐ The same

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of $130.00 required by 37 CFR 1.17(k) is required to be filed with the application or within such time as may be set by the Office. 37 CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

☑ English

☐ non-English

☐ the attached translation is a verified translation. 37 CFR 1.52(d).

8. Assignment

☑ An assignment of the invention to ADVANCED LIGHTWEIGHT CONSTRUCTIONS GROUP B.V.

☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☑ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: *A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993. 1150 O.G. 62-64.*

9. Certified Copy

Certified copy of application

Country	Appln. No.	Filed
Netherlands	1014290	February 4, 2000

from which priority is claimed

☐ is attached.

☑ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 CFR 1.16)

A. ☑ Regular Application

Claims as Filed

Number Filed			Number Extra		Rate	Basic Fee 37 CFR 1.16(a) $690.00
Total Claims (37 CFR 1.16(c))	22	- 20 =	2	x $	18.00	36.00
Independent Claims (37 CFR 1.16(b))	2	- 3 =	0	x $	78.00	
Multiple dependent claim(s), if any (37 CFR 1.16(d))				+ $	260.00	

☐ Amendment cancelling extra claims enclosed.

☑ Amendment deleting multiple-dependencies enclosed.

☑ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation $ 690.00

B. ☐ Design application
($310.00 — 37 CFR 1.16(f))

Filing Fee Calculation $

C. ☐ Plant application
($480.00 — 37 CFR 1.16(g))

Filing Fee Calculation $

11. Small Entity Statement(s)

☑ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is(are) attached or has been filed.

Filing Fee Calculation (50% of **A**, **B** or **C** above) $345.00

NOTE: Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. 37 CFR 1.28(a).

12. Request for International-Type Search (37 CFR 1.104(d)) *(Complete, if applicable)*

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made At This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time. *(This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.)*

☑ Enclosed

☑ basic filing fee $345.00

☐ Recording assignment
($40.00; 37 CFR 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION.")

☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached.
($130.00; 37 CFR 1.47 and 1.17(h)) $

☐ For processing an application with a specification in a non-English language.
($130.00; 37 CFR 1.52(d) and 1.17(k)) $

☐ Processing and retention fee
($130.00; 37 CFR 1.53(d) and 1.21(l)) $

☐ Fee for international-type search report
($40.00; 37 CFR 1.21(e)). $

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application which is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid or the processing and retention fee of §1.21(l) must be paid within 1 year from notification under §53(d).

Total fees enclosed $ 345.00

14. Method of Payment of Fees

☑ Check in the amount of $345.00

☐ Charge Account No. 12-0425 in the amount of $

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: *If no fees are to be paid on filing, the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

☑ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 12-0425.

☑ 37 CFR 1.16(a), (f) or (g) (filing fees)

☐ 37 CFR 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☑ 37 CFR 1.17 (application processing fees)

WARNING: *While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under §1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5,1985 (1060 O.G. 27)*

☑ 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application ... prior to paying, or at the time of paying, ... issue fee". From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions As To Overpayment

☑ credit Account No. 12-0425

☐ refund

Signature of Attorney

Reg. No. 25,858

Tel. No. (212) 708-1930

William R. Evans
Ladas & Parry
26 West 61 Street
New York, NY 10023

☐ **Incorporation by reference of added pages**

(Check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added ___

☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added ___

☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added ___

☑ **Statement Where No Further Pages Added**

(If no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item:)

☑ This transmittal ends with this page.

Practitioner's Docket No. U 012967-6 *PATENT*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

[ ] In re application of:
Application No.: Group No.:
Filed: Examiner:
For:

[ ] *Patent No.: Issue Date:

**NOTE: Insert name(s) of inventor(s) and title also for patent Where statement is with respect to a maintenance fee payment, also insert application number and filing date, and add Box M. Fee to address.*

STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(c-f) and 1.27(b-d))

With respect to the invention described in
[x] the specification filed herewith.
[ ] application no. _____, filed _____.
[ ] patent no. _____ issued _____.

I. IDENTIFICATION AND RIGHTS AS A SMALL ENTITY

I hereby state that I am

(complete either (a), (b), (c) or (d) below)

(a) Independent Inventor
[ ] a below named independent inventor, and that I qualify as an independent inventor, as defined in 37 CFR 1.9(c), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office.

(b) Noninventor Supporting a Claim by Another
[ ] making this statement to support a claim by

---

for a small entity status for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code. I hereby state that I would qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, if I had made the above identified invention.

(c) Small Business Concern

[ ] the owner of the small business concern identified below:

[x] an official of the small business concern empowered to act on behalf of the concern identified below:

Name of Concern Advanced Lightweight Constructions Group B.V.

Address of Concern Kluyverweg 2a, NL-2629 HT Delft, The Netherlands

and

that the above identified small business concern qualifies as a small business concern, as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

(d) Non-Profit Organization

[ ] an official empowered to act on behalf of the nonprofit organization identified below:

Name of Organization

Address of Organization

TYPE OF ORGANIZATION

[ ] University or Other Institution of Higher Education

[ ] Tax Exempt Under Internal Revenue Service Code (26 USC 501(a) and 501(c) (3))

[ ] Nonprofit Scientific or Educational Under Statute of State of the United States of America
(Name of State_____)
(Citation of Statute_____)

[ ] Would Qualify as Tax Exempt Under Internal Revenue Service Code (26 USC 501(a) and 501(c) (3)), if Located in the United States of America

[ ] Would Qualify as Nonprofit Scientific or Educational Under Statute of State of the United States of America, if Located in the United States of America
(Name of State_____)
(Citation of Statute_____)

and that the nonprofit organization identified above qualifies as a nonprofit organization, as defined in 37 CFR 1.9(e), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code.

II. OWNERSHIP OF INVENTION BY DECLARANT

I hereby state that rights under contract or law remain with and/or have been conveyed to the above identified

[ ] person	[x] concern	[ ] organization
(item (a) or (b) above)	(item (c) above)	(item (d) above)

EXCEPT, that if the rights held are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held (1) by any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, (2) any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or (3) a nonprofit organization under 37 CFR 1.9(e).

[ ] no such person, concern, or organization
[ ] person, concerns or organizations listed below*

**NOTE: Separate statements are required from each named person, concern or organization having rights to the invention as to their status as small entities. (37 CFR 1.27)*

Full Name Koppert, Jan Jacobus Matthijs
Address Kluyverweg 2a, NL-2629 HT Delft, The Netherlands

[ ] INDIVIDUAL [x] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

Full Name
Address
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

III. ACKNOWLEDGEMENT OF DUTY TO NOTIFY PTO OF STATUS CHANGE

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

IV. DECLARATION

(check the following item, if desired)

NOTE: The following verification statement need not be made in accordance with the rules published on October 10, 1997, 62 Fed. Reg. 52131, effective December 1, 1997.

NOTE: AThe presentation to the Office (whether by signing, filing, submitting, or later advocating) of any paper by a party, whether a practitioner or non-practitioner, constitutes a certification under ' 10.18(b) of this chapter. Violations of ' 10.18(b)(2) of this chapter by a party, whether a practitioner or non-practitioner, may result in the imposition of sanctions under ' 10.18(c) of this chapter. Any practitioner violating ' 10.18(b) may also be subject to disciplinary action. See '' 10.18(d) and 10.23(c)(15).@ 37 CFR 1.4(d)(2).

[x] I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

V. SIGNATURES

(complete only (e) or (f) below)

(e)
NOTE: All inventors must sign the statement.

_____
Name of Inventor

_____ Date: _____
Signature of Inventor

_____
Name of Inventor

_____ Date: _____
Signature of Inventor

_____
Name of Inventor

_____ Date: _____
Signature of Inventor

(add lines for any additional inventors who must sign)

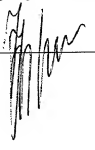
or

(f)
NOTE: The title of the person signing on behalf of a concern or nonprofit organization should be specified.

Name of Person Signing Koppert, Jan Jacobus Matthijs

Title of Person Managing Director
(if signing on behalf of a concern or non-profit organization)

Address of Person Signing Kluyverweg 2a, NL-2629 HT Delft, The Netherlands

SIGNATURE  DATE 20 Sep 2000

09575496 090900

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Andy DEBECKER et al.

For: FIBRE-REINFORCED PRESSURE VESSEL AND METHOD OF MANUFACTURING A FIBRE-REINFORCED PRESSURE VESSEL

Attorney Docket No.: U 012967-6

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Please amend the above identified application as follows:

IN THE CLAIMS

Claim 3, line 1, delete "or claim 2"

Claim 4, line 1, delete "or claim 2".

Claim 5, line 1, delete "any preceding claim" and substitute therefor --claim 1--

Claim 7, line 1, delete "any of claims 1-6" and substitute therefor --claim 1--.

Claim 8, line 1, delete "any of claims 1-6" and substitute therefor --claim 1--.

CERTIFICATE UNDER 37 1.10

I hereby certify that this paper is being deposited with the United States Postal Service on this date SEPTEMBER 29, 2000 in an envelope as "EXPRESS MAIL POST OFFICE TO ADDRESSEE" Mailing Label Number EL699731755US addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231

IBIS CARRILLO
(Type or print name of person mailing paper)

Ibis Carrillo
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "EXPRESS MAIL" mailing label place thereon prior to mailing 37 CFR 1.16(b).

Claim 9, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 10, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 11, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 12, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 13, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 14, line 1, delete "any of claims 1-8" and substitute therefor --claim 1--.

Claim 15, line 1, delete "any of claims 9-11" and substitute therefor --claim 9--.

Claim 16, line 1, delete "or claim 13".

Claim 17, line 1, delete "or claim 14".

Claim 19, line 1, delete "any of preceding claim" and substitute therefor --claim 1--.

Claim 22, lines 1 and 2, delete "or claim 21".

Respectfully submitted,

WILLIAM R. EVANS
LADAS & PARRY
26 WEST 61ST STREET
NEW YORK, NEW YORK 10023
REG.NO.25,858 (212)708-1930

FIBRE-REINFORCED PRESSURE VESSEL AND METHOD OF MANUFACTURING A FIBRE-REINFORCED PRESSURE VESSEL

The invention relates to a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments. The invention also relates to a method of manufacturing a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments.

Known fibre-reinforced pressure vessels comprise a rigid gas- or fluid-tight body overwound with fibre filaments. During the manufacturing of fibre-reinforced pressure vessels fibre filaments are applied in certain patterns, so that when the pressure vessel is under internal pressure the fibre filaments can absorb tensile stresses. Prior to, during or after winding, a binder or resin (a so-called matrix material) is applied to the body which is (to be) overwound or to the fibre filaments. After winding, the matrix material is cured so that the fibre filaments are incorporated in a matrix (the binder or resin). In fibre-reinforced pressure vessels the matrix serves to transfer shear stresses from one fibre filament to another or to the gas- or fluid-tight body when the pressure vessel is under internal pressure. Sometimes extra windings are applied to (sections of) the gas- or fluid-tight body in order to absorb mechanical loads resulting from inter alia shear stresses.

Known methods of manufacturing fibre-reinforced pressure vessels comprise a solidification or curing step in order to incorporate the wound fibre filaments in a matrix. Curing takes time, usually 6 to 8 hours.

A disadvantage of known pressure vessels and methods of manufacturing the same is the need for a solidification or curing step which usually lasts 6 to 8 hours. Another disadvantage is that for absorbing mechanical loads resulting from inter alia shear stresses extra windings are sometimes necessary.

It is an objective of the invention to provide an improved pressure vessel. It is another objective of the invention to provide a reduction of production costs of fibre-reinforced pressure vessels. It is yet another objective of the invention to provide an improved method of manufacturing fibre-reinforced pressure vessels.

According to a first aspect of the invention one or more objectives are achieved with a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments, whereby at least a number of fibre filaments can move freely with respect to one another and the fibre filaments are wound such that when the pressure vessel is under internal pressure the fibre filaments are loaded exactly in their longitudinal direction.

Since the fibre filaments are wound such that, when the pressure vessel is under internal pressure, they are loaded only longitudinally, they will remain in place during use and a matrix will not be required.

It is further achieved that only just as much fibre material needs to be used as is necessary for exactly absorbing the mechanical stresses in the pressure vessel. No extra fibre filaments are necessary, leading to a reduction in weight and to lower costs as compared to known pressure vessels.

Since at least a number of fibre filaments can move freely with respect to one another and the fibre filaments are wound such that when the pressure vessel is under internal pressure the fibre filaments are loaded exactly in their longitudinal direction, the fibre filaments in that section of the pressure vessel will be displaced with respect to one another when the pressure vessel for example is damaged.

Preferably, the fibre filaments can move freely with respect to one another throughout the whole of the pressure vessel.

This is advantageous in that no matrix material (for example, resin) at all needs to be used. This makes a curing step superfluous and it leads to lower costs as compared to known pressure vessels.

Preferably, the pressure vessel according to the invention has an isotensoid shape, that is, a shape whereby when the pressure vessel is under internal pressure the mechanical stresses are distributed equally among the fibre filaments. In order to provide the pressure vessel with the desired isotensoid shape a means for axially strengthening the pressure vessel may be used.

Since an isotensoid shape is used, only a minimum number of fibre filaments are needed in order to absorb the mechanical stresses in the pressure vessel.

Moreover preferably, the pressure vessel according to the invention has a cylindrical shape which is provided with isotensoid end pieces at both longitudinal ends thereof.

By providing the pressure vessel with a cylindrical shape, it is suitable for use as a gas flask.

Preferably, the pressure vessel according to the invention is provided with a protective layer, a so-called coating.

A coating comprising synthetic rubber is particularly suitable as a protective means against fire and against small impact and handling loads.

Preferably, the rigid body of a pressure vessel according to the invention is made of high-density polyethene (HDPE) and the fibre filaments are carbon filaments.

This combination of materials is advantageous from the viewpoint of production costs and the weight and strength of the pressure vessel.

Preferably, the rigid body of a pressure vessel according to the invention is made of high-density polyethene (HDPE) and the fibre filaments are glass fibres.

This combination of materials, too, is advantageous from the viewpoint of production costs and the weight and strength of the pressure vessel.

A pressure vessel according to the invention can be manufactured in different embodiments and thus be made suitable for different maximum internal pressures.

According to a second aspect of the invention one or more objectives are achieved through a method of manufacturing a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments, whereby the method of manufacturing comprises the steps of:

a) providing a rigid gas- or fluid-tight body, fibre filaments and a winding apparatus;

b) overwinding the rigid body such that at least a number of fibre filaments can move freely with respect to one another and the fibre filaments are wound such that when the pressure vessel is under internal pressure the fibre filaments are loaded exactly in their longitudinal direction;

whereby no matrix material (for example, resin) is provided such that the fibre filaments would be incorporated in a matrix for that section of the pressure vessel in which the fibre filaments can move freely with respect to one another.

By this it is achieved that no more fibre material is used than that what is necessary for exactly absorbing the mechanical stresses in the pressure vessel. This leads to a reduction of the costs of manufacturing of the pressure vessel.

Preferably, no matrix material at all is provided for in the method according to the invention. By not providing for a matrix material in the pressure vessel a curing step is made superfluous. By this a shortening of the production time is achieved with respect to the time which would otherwise be needed for solidification or curing, which usually is 6 to 8 hours.

The invention is illustrated by way of two embodiments of the pressure vessel and one embodiment of the method of manufacturing the pressure vessel with reference to the accompanying drawings.

Figure 1 depicts a first embodiment of the pressure vessel according to the invention having an isotensoid shape;

Figure 2 depicts a second embodiment of the pressure vessel according to the invention having a cylindrical shape;

Figure 3 is an axial cross-section view of an end of the pressure vessel of Figure 2;

Figures 4A and 4B depict cross-sectional views of an example of the rigid body of a pressure vessel with fibre filaments abutting the rigid body according to the invention; and

Figure 5 depicts schematically the mechanical load on a fibre filament in its longitudinal direction according to the invention.

Referring to the drawings the two given embodiments of the pressure vessel according to the invention are now described.

Figure 1 depicts a first embodiment of the pressure vessel according to the invention. The pressure vessel (1) comprises a rigid gas- or fluid-tight body (2) having an isotensoid shape. There are fibre filaments (3) wound around the rigid body (2). There is also an auxiliary means (4). In this example the auxiliary means (4) is a means for axially strengthening the pressure vessel (1). The auxiliary means (4) is provided with means (5), screw holes in this example, with which an appendage (not shown) such as a closure member or a pressure valve can be attached to the pressure vessel (1).

Figure 2 depicts a second embodiment of the pressure vessel according to the invention. The pressure vessel (6) comprises a rigid gas- or fluid-tight body (7) having a cylindrical shape. The cylindrical body (7) is provided with an end-piece (8) having an isotensoid shape. The cylindrical rigid body (7) is shown mounted on a rotation-axis (9) which is used for winding fibre filaments around the rigid body (7). The rigid body (7) has several filaments (10) overwound in the circumferential direction of the rigid body (7) (so-called 'hoop windings') and several filaments (11) overwound in the longitudinal direction of the rigid body (7) (so-called 'helical or polar windings').

The rigid body may comprise a thin layer of metal, a thermoplastic or thermo-setting material, provided that the material meets the safety specifications applicable for the substance to be contained in the pressure vessel.

The fibre material is preferably carbon fibre, but it can also be any other fibre type which can be subjected to tensile stresses, such as E-type, R-type or S-type glass fibre, p-aramide fibre, carbon fibre or fibres of polymers such as polyethene, polyester or polyamide.

Figure 3 depicts an axial cross-section view of an end of the pressure vessel (6) according to Figure 2. It shows an end (12) of the cylinder-shaped rigid gas- or fluid-tight body (13) and an auxiliary member (14) bordering the rigid body (13). In this example the auxiliary member (14) and the rigid body together provide the end (12) with an isotensoid shape. In this example there are also openings (15) and (16) in the axial direction of the pressure vessel (6). This embodiment also depicts how the rigid body (13) and the auxiliary member (14) together have been overwound with a layer (17) of fibre filaments (which are shown schematically).

Figures 4A and 4B depict cross-sectional views of an example of the positions of fibre filaments (18) lying against (abutting) the rigid body (19) of a pressure vessel according to the invention. In this example the fibre filaments (18) are in a cubic closest packing. Figure 4B also shows a coating (20) which has been applied to the fibre filaments.

Figure 5 depicts the load with respect to an arc (AD) of a fibre filament when the pressure vessel is under internal pressure (f) and the resulting reaction force (F) of the arc (AD) of the fibre filament. R represents the radius of the rigid body and dv represents the arc angle. The fibre filament, of course, also exerts a normal force on the rigid body.

The following is a description of an example of the method of manufacturing - according to the invention- a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments.

One first determines the function of the pressure vessel and selects the materials to be used for the pressure vessel. Next, one determines a design, that is, the shape of the apparatus including parameters such as the volume and dimensions of the vessel, the maximum allowable internal pressure, safety factors, and the dimensions of the outflow openings in the pressure vessel. A suitable production process is also selected. According to the invention the process is winding with fibres ('filament winding'). For this process one determines a winding pattern appropriate in regard of the shape of the pressure vessel whereby in the winding pattern the fibre filaments are overwound such that at least a number of fibre filaments can move freely with respect to one another and when the pressure vessel is under internal pressure the fibre filaments are loaded exactly in their longitudinal direction. The rigid body thereby is not to contribute to the absorption of mechanical stresses resulting from the internal pressure. The rigid body can be manufactured according to any known method, for example a method using a mould and blow moulding or spray moulding or rotation moulding. Subsequently, the rigid body is mounted on a winding apparatus ('filament winding machine'). After setting the controls of the winding apparatus the leading end of a filament to be wound is attached to the rigid body, the rigid body is overwound and the end of the wound filament is fastened. Some-

times the winding pattern is applied in several stages. In the case of a cylinder-shaped rigid body for example, filaments overwound in the circumferential direction (so-called 'hoop windings') and filaments overwound in the longitudinal direction (so-called 'helical or polar windings') are, for example, applied separately. When applying filaments in the longitudinal direction (so-called 'helical or polar windings') first an auxiliary member is positioned against the rigid body and then the auxiliary member is also overwound with fibre filaments. After the rigid body has been completely overwound, the pressure vessel is optionally provided with a coating, preferably of synthetic rubber. The pressure vessel is optionally provided with an appendage.

The fibres are applied by means of winding, so-called filament winding. Since the fibre filaments are overwound such that, when the pressure vessel is under internal pressure, they are loaded only in their longitudinal direction, they will stay in position during use and a matrix will not be necessary. Preferably, no matrix material (for example, resin) at all is provided.

The fibres are not impregnated or glued or fastened to the rigid body, of course except for the leading end of the very first fibre filament to be overwound. Attachment of the fibre filament can also take place by forming a knot in the fibre filament. Impregnation is usually understood to include partial or complete penetration of any matrix material in or between the fibre filaments. Thus, in the pressure vessel according to the invention no matrix material penetrates in or between the fibre filaments because no matrix material is used. Matrix material is usually a resin, synthetic resin or an elastomer. Furthermore, the rigid body can move freely with respect to the fibre filaments.

In the method according to the invention there is no solidification or curing step at all, thus not prior to, during or after winding.

Optionally, a flexible or a rigid protective layer, a so-called coating, can be provided on top of the fibre filaments. This coating is fire-proof and not constructively supporting, and it serves only to protect the fibre filaments against external influences such as cutting or abrasive actions, chemicals and against the influence of humidity or light. Provision of this coating is not essential for performing the primary function of a pressure vessel, namely safe containment of a substance under pressure.

The coating, if provided for, can be formed from an elastomer or it can comprise a rigid shell of metal or of a thermplastic or thermo-setting material. Preferably, the coating is made of synthetic rubber.

A pressure vessel according to the invention can be used in particular for containing or transporting substances under pressure, such as propane, butane, CNG (compressed natural

gas), air, water and cryogen substances such as liquid nitrogen or liquid oxygen. Depending on the substance to be contained or transported, a pressure vessel according to the invention can be manufactured for a working pressure of 0-5 bar (for example for hot water in an expansion vessel), 0-10 bar (for example for liquid oxygen or liquid nitrogen or for propane gas or butane gas or a mixture thereof in gas flasks intended for use in households and at ambient temperatures), 0-35 bar (for example for propane gas or butane gas at elevated temperatures), 0-100 bar (for example for LPG in fuel tanks intended for use in motor vehicles), 0-300 bar (for example for CNG or compressed air), and 0-600 bar for cryogenic gas systems in space technology applications.

The invention described above has the impact of a breakthrough in the field of winding technology, in particular by overcoming the technical prejudice that use of a matrix material such as a resin is essential for fibre-reinforced pressure vessels. The invention is therefore considered to have a broad scope and not to be limited to only the above-described embodiments.

CLAIMS

1. Fibre-reinforced pressure vessel (1, 6) comprising a rigid gas- or fluid-tight body (2, 7, 13, 19) overwound with fibre filaments (3, 10, 11, 18), whereby at least a number of fibre filaments (3, 10, 11, 18) can move freely with respect to one another and the fibre filaments (3, 10, 11, 18) are wound such that when the pressure vessel is under internal pressure, the fibre filaments (3, 10, 11, 18) are loaded exactly in their longitudinal direction.

2. Fibre-reinforced pressure vessel (1, 6) according to claim 1, whereby all wound fibre filaments (3, 10, 11, 18) can move freely with respect to one another.

3. Fibre-reinforced pressure vessel according to claim 1 or claim 2, whereby the pressure vessel (1) has an isotensoid shape.

4. Fibre-reinforced pressure vessel according to claim 1 or claim 2, whereby the pressure vessel (6) has a cylindrical shape.

5. Fibre-reinforced pressure vessel according to any preceding claim, whereby the pressure vessel (1, 6) is provided with a coating (20).

6. Fibre-reinforced pressure vessel according to claim 5, whereby the coating (20) comprises synthetic rubber.

7. Fibre-reinforced pressure vessel according to any of claims 1-6, whereby the rigid body (2, 7, 13, 19) is made of high-density polyethene (HDPE) and the fibre filaments (3, 10, 11, 18) are carbon fibres.

8. Fibre-reinforced pressure vessel according to any of claims 1-6, whereby the rigid body (2, 7, 13, 19) is made of high-density polyethene (HDPE) and the fibre filaments (3, 10, 11, 18) are glass fibres.

9. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-5 bar.

10. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-10 bar.

11. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-35 bar.

12. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-100 bar.

13. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-300 bar.

14. Fibre-reinforced pressure vessel according to any of claims 1-8, whereby the pressure vessel (1, 6) can withstand a working pressure in the range of 0-600 bar.

15. Fibre-reinforced pressure vessel according to any of claims 9-11, suitable for use as a gas flask for propane or butane or a mixture thereof for household uses.

16. Fibre-reinforced pressure vessel according to claim 12 or claim 13, suitable as a fuel tank, in particular for LPG, for use in motor vehicles.

17. Fibre-reinforced pressure vessel according to claim 13 or claim 14, suitable as a fuel tank for CNG or compressed air.

18. Fibre-reinforced pressure vessel according to claim 14 suitable for use as a cryogenic gas system in space technology applications.

19. Fibre-reinforced pressure vessel according to any preceding claim, whereby the pressure vessel (1, 6) is provided with an appendage, for example a closure member or a pressure valve.

20. Method of manufacturing a fibre-reinforced pressure vessel comprising a rigid gas- or fluid-tight body overwound with fibre filaments, whereby the method comprises the steps of:

a) providing a rigid gas- or fluid-tight body, fibre filaments and a winding apparatus;

b) overwinding the rigid body such that at least a number of fibre filaments can move freely with respect to one another and the fibre filaments are wound such that when the pressure vessel is under internal pressure vessel the fibre filaments are loaded exactly in their longitudinal direction;

whereby no matrix material (for example, resin) is provided such that the fibre filaments would be incorporated in a matrix for that section of the pressure vessel in which the fibre filaments can move freely with respect to one another.

21. Method of manufacturing according to claim 20, whereby no matrix material at all is provided.

22. Mould for use in manufacturing a fibre-reinforced pressure vessel according to claim 20 or claim 21.

ABSTRACT

The invention relates to a fibre-reinforced pressure vessel (1, 6) comprising a rigid gas- of fluid-tight body (2, 7, 13, 19) overwound with fibre filaments (3, 10, 11, 18), whereby the fibre filaments are wound such that at least a number of fibre filaments can freely move with respect to one another and when the pressure vessel is under internal pressure the fibre filaments are loaded exactly in their longitudinal direction.

The invention also relates to a method of manufacturing a fibre-reinforced pressure vessel whereby no matrix material (for example, resin) is used so that at least a number of fibre filaments would be incorporated in a matrix for that section of the pressure vessel in which the fibre filaments can freely move with respect to one another.

Fig. 2.

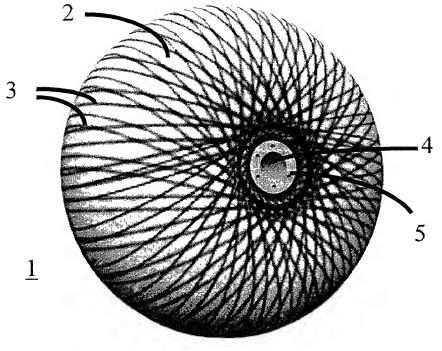


Fig. 1

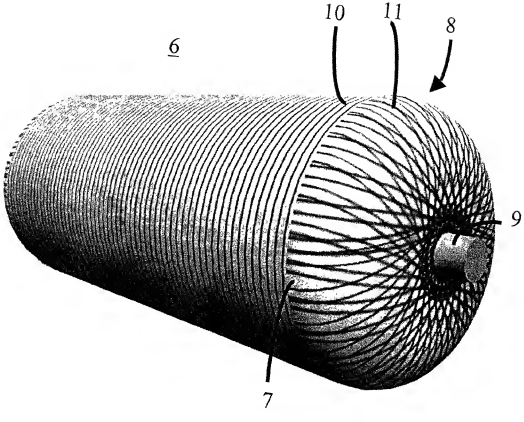


Fig. 2

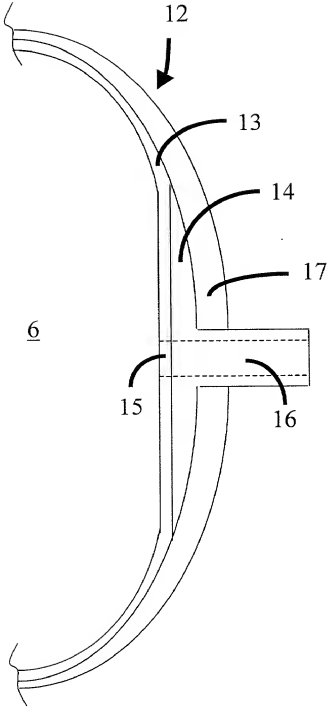


Fig. 3

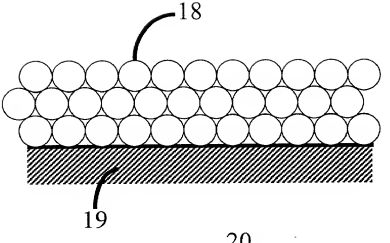


Fig. 4A

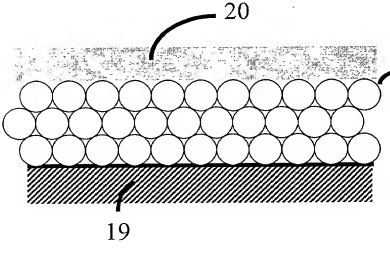


Fig. 4B

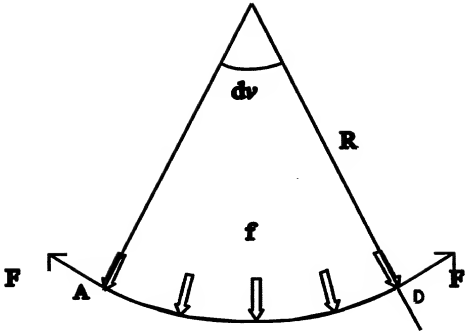


Fig. 5

Practitioner's Docket No. U012967-6

PATENT

00140
PATENT TRADEMARK OFFICE

Optional Customer No. Bar Code →

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION, OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

[x] original.
[ ] design.

NOTE: With the exception of a supplemental oath or declaration submitted in a reissue, a supplemental oath or declaration is not treated as an amendment under 37 CFR 1.312 (Amendments after allowance). M.P.E.P. Section 714.16, 7th Ed.

[ ] supplemental.

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

[ ] national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

NOTE: See 37 C.F.R. Section 1.63(d) (continued prosecution application) for use of a prior nonprovisional application declaration in the continuation or divisional application being filed on behalf of the same or fewer of the inventors named in the prior application.

[ ] divisional.
[ ] continuation.

NOTE: Where an application discloses and claims subject matter not disclosed in the prior application, or a continuation or divisional application names an inventor not named in the prior application, a continuation-in-part application must be filed under 37 C.F.R. Section 1.53(b) (application filing requirements-nonprovisional application).

[ ] continuation-in-part (C-I-P).

INVENTORSHIP IDENTIFICATION

WARNING: *If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.*

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor *(if only one name is listed below)* or an original, first and joint inventor *(if plural names are listed below)* of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

Fibre-reinforced pressure vessel and method of manufacturing afibre-reinforced pressure vessel

---

SPECIFICATION IDENTIFICATION

The specification of which:

(complete (a), (b), or (c))

(a) [x] is attached hereto.

NOTE: *"The following combinations of information supplied in an oath or declaration filed on the application filing date with a specification are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

"(1) name of inventor(s), and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration on filing;

"(2) name of inventor(s), and attorney docket number which was on the specification as filed; or

"(3) name of inventor(s), and title which was on the specification as filed."

Notice of July 13, 1995 (1177 O.G. 60).

(b) [ ] was filed on _____, [ ] as Application No. _____
[ ] and was amended on _____ (if applicable).

NOTE: *Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 C.F.R. Section 1.67.*

NOTE: *"The following combinations of information supplied in an oath or declaration filed after the filing date are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

(A) application number (consisting of the series code and the serial number, e.g., 08/123,456);
(B) serial number and filing date;
(C) attorney docket number which was on the specification as filed;
(D) title which was on the specification as filed and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration; or
(E) title which was on the specification as filed and accompanied by a cover letter accurately identifying the application for which it was intended by either the application number (consisting of the series code and the serial number, e.g., 08/123,456), or serial number and filing date. Absent any statement(s) to the contrary, it will be presumed that the application filed in the PTO is the application which the inventor(s) executed by signing the oath or declaration.

M.P.E.P. Section 601.01(a), 7th ed.

(c) [ ] was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on_____*(if any)*.

SUPPLEMENTAL DECLARATION (37 C.F.R. Section 1.67(b))

(complete the following where a supplemental declaration is being submitted)

[ ] I hereby declare that the subject matter of the

[ ] attached amendment
[ ] amendment filed on _____.

was part of my/our invention and was invented before the filing date of the original application, above identified, for such invention.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, Section 1.56,

(also check the following items, if desired)

[ ] and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

[ ] in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 C.F.R. Section 1.98.

PRIORITY CLAIM (35 U.S.C. Section 119(a)-(d))

NOTE: "The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by Section 1.63. The claim for priority and the certified copy of the foreign application specified in 35 U.S.C. Section 119(b) must be filed in the case of an interference (Section 1.630), when necessary to overcome the date of a reference relied upon by the examiner, when specifically required by the examiner, and in all other situations, before the patent is granted. If the claim for priority or the certified copy of the foreign application is filed after the date the issue fee is paid, it must be accompanied by a petition requesting entry and by the fee set forth in Section 1.17(i). If the certified copy is not in the English language, a translation need not be filed except in the case of interference; or when necessary to overcome the date of a reference relied upon by the examiner; or when specifically required by the examiner, in which event an English language translation must be filed together with a statement that the translation of the certified copy is accurate." 37 C.F.R. Section 1.55(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) [ ] no such applications have been filed.
(e) [x] such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. SECTION 119(a)-(d)

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING DAY, **MONTH**, YEAR	PRIORITY CLAIMED UNDER 35 USC 119
NL	1014290	04.**02**.2000	[x]YES [ ]NO
			[ ]YES [ ]NO
			[ ]YES [ ]NO
			[ ]YES [ ]NO
			[ ]YES [ ]NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(35 U.S.C. Section 119(e))

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER	**FILING DATE**
/ _____	_____
/ _____	_____
/ _____	_____

CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S) UNDER 35 U.S.C. SECTION 120

[ ] The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

ALL FOREIGN APPLICATION(S), *IF ANY*, FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. Section 120.

POWER OF ATTORNEY

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(list name and registration number)

JOSEPH H. HANDELMAN, 26179	RICHARD P. BERG, 28145
JOHN RICHARDS, 31053	JULIAN H. COHEN, 20302
RICHARD J. STREIT, 25765	WILLIAM R. EVANS 25858
PETER D. GALLOWAY, 27885	JANET I. CORD, 33778
IAN C. BAILLIE, 24090	CLIFFORD J. MASS, 30086
THOMAS F. PETERSON, 24790	CYNTHIA R. MILLER, 34678

(Check the following item, if applicable)

[ ] I hereby appoint the practitioner(s) associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

[ ] Attached, as part of this declaration and power of attorney, is the authorization of the above-named practitioner(s) to accept and follow instructions from my representative(s).

NOTE: "Special care should be taken in continuation or divisional applications to ensure that any change of correspondence address in a prior application is reflected in the continuation or divisional application. For example, where a copy of the oath or declaration from the prior application is submitted for a continuation or divisional application filed under 37 CFR 1.53(b) and the copy of the oath or declaration from the prior application designates an old correspondence address, the Office may not recognize, in the continuation or divisional application, the change of correspondence address made during the prosecution of the prior application. Applicant is required to identify the change of correspondence address in the continuation or divisional application to ensure that communications from the Office are mailed to the current correspondence address. 37 CFR 1.63(d)(4)." Section 601.03, M.P.E.P., 7th Ed

SEND CORRESPONDENCE TO

Ladas & Parry
26 West 61st Street
New York, N.Y. 10023

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

(complete the following if applicable)

Since this filing is a [ ] continuation [ ] divisional there is attached hereto a Change of Correspondence Address so that there will be no question as to where the PTO should direct all correspondence.

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other document.

NOTE: Each inventor must be identified by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and by his/her residence, post office address and country of citizenship. 37 C.F.R. Section 1.63(a)(3).

NOTE: Inventors may execute separate declarations/oaths provided each declaration/oath sets forth all the inventors. Section 1.63(a)(3) requires that a declaration/oath, inter alia, identify each inventor and prohibits the execution of separate declarations/oaths which each sets forth only the name of the executing inventor. 62 Fed. Reg. 53,131, 53,142, October 10, 1997,

Full name of sole or first inventor
Andy Debecker

(Given Name) *(Middle Initial or Name)* *Family (Or Last Name)*

Inventor's signature _____

Date 20/9/2000 **Country of Citizenship** Belgium

Residence Arthur van Schendelplein 132, NL-2624 CV Delft, The Netherlands

Post Office Address _____

■■■■■■

Full name of second joint inventor, if any
Oscar | Christoph | van der Jagt
(Given Name) | *(Middle Initial or Name)* | *Family (Or Last Name)*

Inventor's signature _____

Date _____ **Country of Citizenship** The Netherlands

Residence Van Hasseltplein 2, NL-2625 JT Delft, The Netherlands

Post Office Address _____

■■■■■■

Full name of third joint inventor, if any
Jan Jacobus | Matthijs | Koppert
(Given Name) | *(Middle Initial or Name)* | *Family (Or Last Name)*

Inventor's signature _____

Date _____ **Country of Citizenship** **The Netherlands**

Residence **Schoolstraat 32, NL-2611 HS Delft, The Netherlands**

Post Office Address _____

(check proper box(es) for any of the following added page(s) that form a part of this declaration)

[ ] **Signature** for fourth and subsequent joint inventors. *Number of pages added* _____

* * *

[ ] **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____

* * *

[ ] **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 C.F.R. Section 1.47. *Number of pages added* _____

* * *

[ ] Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 C.F.R. Section 1.47)

* * *

[ ] Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

[ ] Number of pages added _____

* * *

[ ] Authorization of practitioner(s) to accept and follow instructions from representative.

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item)

[ ] This declaration ends with this page.